

DOCK TO DOORSTEP:
An Overview of Community Supported Fishery (CSF)
Programs in the United States & Canada

by

Alexis Bolton

Dr. Xavier Basurto, Advisor

Masters project submitted in partial fulfillment of the requirements
for the Master of Environmental Management degree in the
Nicholas School of the Environment at Duke University

May 2015



“There is no more intimate relationship we can have with our environment than to eat from it.”

-- Paul Greenberg

EXECUTIVE SUMMARY

Growing demand for seafood products, coupled with declining local fish stocks, has led to an increasingly global seafood industry. In the United States, over 90 percent of the seafood consumed is imported (NOAA Fisheries, 2014) and travels, on average, over 8800 kilometers from boat to plate (McClenachan et al., 2014). The lack of transparency associated with international seafood supply chains is making traceability of products increasingly problematic (Roheim, 2008). Recent studies have suggested one-third of the seafood in the United States is mislabeled (Oceana, 2015), and illegal fishery products make up as much as 30% of the wild caught seafood imported into the U.S. (Pramod et al., 2014).

The globalized supply chain has generated a disconnect between seafood harvesters and consumers. Consumers lack information about their products and access to domestically caught seafood, while domestic producers struggle to stay alive amidst the inflow of imported products. In response, Community Supported Fishery (CSF) programs have gained popularity over the last decade. Based loosely on the Community Supported Agriculture (CSA) model, CSFs are generally described as altering the traditional seafood supply chain by connecting fishers more directly to consumers. While ‘CSF’ is often used as a unifying term, implying its adherents share similar philosophies, structures and benefits, CSF programs can vary with respect to their philosophy, structure and operation. Understanding the diversity of CSF programs is an important step towards creating consistency within CSF programs and with how the term is used.

The purpose of this project is to (1) provide an overview of the characteristics of CSF programs, (2) investigate how CSF programs differ, why these differences exist, and (3) classify CSF programs into general categories in order to draw attention to the diversity of arrangements and help ensure potential benefits of CSFs are presented accurately. To gather data on CSF arrangements, semi-structured phone interviews were conducted with 22 CSFs in the United States in Canada, representing 56% of the CSFs currently in operation.

Results indicate the term CSF represents a diversity of arrangements in terms of origin, legal organization, goals, seafood species, sourcing practices, distribution methods, consumer

commitment systems and supplementary seafood sales. There are several drivers of this diversity in CSF arrangements. First and foremost, the ‘CSF’ term is a self-adopted label and there are currently no formal regulations around what is, or should be, considered a CSF; unrestricted use of the term has resulted in a variety of organizations self-classifying as CSFs. Furthermore, CSF programs are often assumed to share a common set of goals; however, as the results of this study suggest, not all CSF programs aim to achieve the same goals, and thus may be arranged in different ways in an effort to attain their individual goals. CSFs are also constrained in what they can do based on the local context within which they operate; regional fishing regulations, local consumer demographics or the broader food landscape may shape the operations of a CSF. Finally, CSFs are not necessarily stand-alone institutions or organizations; rather CSFs are *programs* – strategies employed by an organization to market seafood products. The degree of diversification and relative importance of the CSF strategy to the business also plays an important role in determining how each CSF is structured.

While the results illustrate the diversity of CSF arrangements, there are several attributes that CSFs *do* share in common. CSFs all differ from mainstream supply chains by attempting to establish meaningful connections between consumers and producers. All seafood sold through CSF programs is domestically sourced, and traceable to a specific fisher, boat or community of harvesters. All CSF programs also provide consumers with access to information about the product they are purchasing, even those that do not specifically focus on consumer education and awareness as one of their primary objectives. This may include simply informing consumers of where the product was caught, how it was caught or who caught it; a significant improvement from seafood purchased through traditional supply chains.

To draw attention to the diversity of arrangements the term ‘CSF’ represents, and help ensure the potential outcomes or benefits of a particular CSF arrangement are presented accurately, three types of CSFs have been identified based on the results of this study: (1) community driven, (2) harvester driven, and (3) species driven. Classifying CSFs into these categories can help advocates and commenters more accurately describe how CSFs are structured and correctly discuss the benefits these arrangements are able to provide.

For more information, please contact: alexis.bolton@gmail.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
LIST OF TABLES	5
LIST OF FIGURES	5
1. INTRODUCTION.....	6
1.1. Globalization of Fisheries	6
1.2. Seafood Supply Chains	7
1.3. Community Supported Fishery Programs	8
1.4. Diversity in CSF Programs	9
2. PROJECT DESCRIPTION	10
3. METHODS	11
3.1. CSF Participation	11
3.2. Interviews.....	12
3.3. Data Analysis	13
4. RESULTS	14
4.1. Emergence.....	14
4.2. Legal Organization.....	14
4.3. Goals	15
4.4. Other Seafood Outlets.....	18
4.5. Consumer Commitment	21
4.6. Species Included in CSF Box	24
4.7. Seafood Sourcing	27
4.8. Distribution	29
4.9. Challenges.....	30
5. DISCUSSION	33
5.1. CSF Variability	33
5.2. Common Characteristics of CSF Programs	38
5.3. Classification of CSF Programs	40
6. REFERENCES	43
7. ACKNOWLEDGEMENTS	46
8. APPENDIX	47
8.1. Appendix A: Interview Guide	47

LIST OF TABLES

Table 1. CSF Codes by Region

Table 2. Summary of divergent and shared characteristics across all CSFs

Table 3. Classification of CSF programs based on shared characteristics

LIST OF FIGURES

Figure 1. Legal structure of organizations operating CSF programs

Figure 2. Stated goals of CSF programs

Figure 3. Organizations with CSF program as the only outlet for seafood products and organizations with CSF programs with other outlets

Figure 4. Other non-CSF program outlets for seafood products

Figure 5. The relative importance of the CSF program and non-CSF outlets (i.e. wholesale) to the business

Figure 6. Occurrence of the varying degrees of commitment required of CSF consumers as a condition of participating in the CSF program

Figure 7. Stated benefits of using a rigid commitment structure (subscription based system)

Figure 8. Stated benefits of using a flexible commitment structure (buy-down credit or flexible subscription system)

Figure 9. Consumer ability to choose species and seafood type in their CSF box

Figure 10. CSF sourcing preferences

Figure 11. Definitions for the term ‘local’ according to CSFs

Figure 12. Frequency of seafood distribution

Figure 13. Stated challenges of selling seafood through a CSF program

1. INTRODUCTION

In the last century, human demand for seafood products has increased dramatically. Worldwide, the average per capita consumption of fish rose from 9.9 kilograms in 1960, to 18.6 kilograms in 2010 (FAO, 2011b). In the United States alone, per capita consumption of seafood increased by 65% over the same period (FAO, 2011a). As the last wild animal harvested on a commercial scale for human consumption, fish and other marine resources are struggling to keep up with the growing demand, and fisheries worldwide are in decline. More than 50% of global fishery resources with commercial value are fully exploited, and an additional 25% are overexploited (Garcia & Moreno, 2003). Loss of marine biodiversity resulting from overexploitation will impair the ocean's ability to provide food to people around the world (Worm et al., 2006).

1.1. Globalization of Fisheries

Growing demand for seafood products, coupled with declining local fish stocks, has led to an increasingly global seafood industry. Local seafood is disappearing from the plates of consumers. Six types of seafood make up majority of the U.S. seafood diet (shrimp, canned tuna, salmon, pollock, tilapia and pangasius) and only a fraction of these are harvested domestically (NOAA Fisheries, 2013). In the United States, over 90 percent of seafood consumed is imported (NOAA Fisheries, 2014) and the average piece of industrially supplied seafood travels over 8800 kilometers from boat to plate (McClenachan et al., 2014).

The influx of low-cost imported seafood is displacing domestic fishers in the United States (Greenberg, 2014). In North Carolina, for example, fishing families who have been earning a living from commercial fishing for centuries are no longer able to sustain themselves on a full-time fishing income, in part due to the impact of imported products. In 2001, fishers in Carteret County, the region with the highest number of commercial fishers in North Carolina, landed approximately 5,254,000 pounds of shrimp, valued at roughly \$11,911,000; five years later approximately 5,736,000 pounds of shrimp were landed, an increase of more than 482,000 pounds, valued at just \$9,141,000 – the drop attributed to the growing supply of imported shrimp and associated decline in price per pound of domestically caught product (Andreatta & Parlier, 2010). This phenomenon is not exclusive to North Carolina; wholesale shrimp prices across the

United States fell forty percent between 1997 and 2002 due to the influx of imported products, with consequences for the American seafood economy and the livelihoods of commercial fishers across the United States (Fritsch, 2004).

1.2. Seafood Supply Chains

The globalization of the seafood industry has altered the structure and length of the supply chain through which products move from producers to consumers. Seafood supply chains are typically comprised of fishers, dealers, processors, distributors, wholesalers and retailers, and becoming increasingly long, complex and internationalized (Vallejo, Hauselmann, & Asante, 2009).

These changes in the seafood supply chain have resulted in a number of concerns regarding the sustainability of seafood. Traceability is critical to sustainable supply chains; products must be traceable from the point of harvest to the point of distribution, including all intermediate steps such as processing (Vallejo et al., 2009). However, the lack of transparency in most traditional seafood supply chains is making traceability of products increasingly problematic (Roheim, 2008). Seafood consumers often have access to very little information about their seafood, and the reliability of this information is often questionable (Jacquet & Pauly, 2008). Recent studies have suggested approximately one-third of seafood in the United States is mislabeled, with fraudulent labeling reaching as high as 70% for certain species like red snapper (Oceana, 2015).

The lack of transparency in seafood supply chains also allows illegally caught seafood products to infiltrate the market (Vallejo et al., 2009). Unlawful fishing operations exploit the complexity of seafood supply chains, mixing in unreported and illegally caught products with legally harvested catch while still at sea or during processing and distribution (Oceana, 2015; Roheim, 2008). As much as 30% of the wild caught seafood imported into the U.S. is the product of illegal fishing, and the lack of traceability for fishery products entering the United States often leaves consumers unaware of their role in purchasing illegally caught seafood (Pramod, Nakamura, Pitcher, & Delagran, 2014).

The globalized supply chain has generated a disconnect between seafood harvesters and consumers. Consumers lack information about their products and access to domestically caught

seafood, while domestic producers struggle to stay alive amidst the inflow of imported products. Programs that reconnect communities with their seafood systems, and support the production and consumption of local seafood products are an essential part of rebuilding the American seafood economy.

1.3. Community Supported Fishery Programs

Community Supported Fishery (CSF) programs are considered to be one way of reestablishing the link between fishers and consumers. Based loosely on the Community Supported Agriculture (CSA) model, CSF programs generally attempt to shorten the traditional seafood supply chain and provide direct marketing opportunities for fishers. In its most basic arrangement, CSF consumers pre-pay for scheduled deliveries of seafood ‘boxes,’ similar to shares of produce delivered by farmers in CSA programs (Brinson, Lee, & Rountree, 2011; Campbell, Boucquey, Stoll, Coppola, & Smith, 2014).

The CSF model has gained popularity since it emerged in 2007, with close to forty CSFs currently operating in the United States and Canada (LocalCatch.org, 2012). A number of benefits for both consumers and producers have been associated with CSF programs:

(1) Increased Access

CSF programs can provide seafood consumers with access to fresh, healthy, locally caught seafood products. They also provide fishers with access to local seafood markets, allowing them to sell their product locally instead of distributing it outside of the region via wholesalers (McClenachan et al., 2014).

(2) Transparent Supply Chains

CSF programs can address concerns associated with illegally caught and mislabeled seafood by shortening and simplifying the supply chain (Brinson et al., 2011). Direct marketing can provide consumers with more information about the food they are eating, including where it was caught and by whom, adding traceability to the seafood system (McClenachan et al., 2014). Many CSFs also provide opportunities for CSF customers to interact directly the fishers who caught their seafood.

(3) Increased Profits for Domestic Fishers

CSFs support the local seafood economy. Integrating marketing and distribution into the same entity can allow fishers to charge above wholesale prices for their product, and earn a better return on a smaller catch (Brinson et al., 2011). By eliminating out-of-region middlemen, who traditionally receive majority of the profits, fishers also have greater control over product pricing (NOAA Fisheries, 2012). CSF programs can also create markets for underutilized species, providing new revenue opportunities for fishers (McClenachan et al., 2014).

(4) Environmental Stewardship

Creating markets for underutilized species, CSFs can potentially reduce pressure on the stocks targeted by industrialized fisheries and encourage consumption of bycatch species that would otherwise be discarded. Shortening the distance between producer and consumer can also lower the carbon footprint of CSF seafood (McClenachan et al., 2014).

(5) Support for Local Fisheries

CSF programs can potentially build the strong base of public support needed to keep small-scale commercial fisheries in the United States and Canada alive and prosperous (Northwest Atlantic Marine Alliance, 2014). CSFs can maintain locally based fishing communities and preserve traditional fishing cultures by helping local fishers feel valued by their community and helping consumers feel connected to the individuals harvesting their food (Olson, Clay, & Pinto da Silva, 2014).

1.4. Diversity in CSF Programs

‘CSF’ is often used as a unifying term, implying its adherents share similar philosophies, structures and benefits. However, the term ‘CSF’ is a self-adopted label, and because there has been no formal regulation of how the term ‘CSF’ is used by organizations, CSF can arrangements vary in a number of ways. While the literature has alluded to differences in CSF structure and operations (i.e. Brinson et al., 2011), the degree of variation in CSF programs has yet to be investigated.

Understanding the diversity of CSF programs is an important step towards creating consistency within CSF programs and with how the term is used, particularly as the model continues to gain popularity amongst consumers and harvesters. It is also important for understanding how differences between CSFs may influence the ability these programs to deliver the array of benefits they are often associated with.

2. PROJECT DESCRIPTION

The purpose of this project is threefold:

1. To provide a general overview of CSF programs currently in operation in the United States and Canada, and describe the general characteristics of these arrangements.
2. To investigate how CSF programs differ, why these differences exist, the impact of these differences on the way we use the term ‘CSF’ and how we promote the benefits of these programs.
3. To classify CSF programs into general categories in order to draw attention to the diversity of arrangements and help ensure potential benefits of certain CSF arrangements are presented accurately.

3. METHODS

3.1. CSF Participation

Twenty-two interviews were conducted with CSF programs operating in the United States and Canada. Participation in the research was voluntary. All 34 CSFs in the online network *LocalCatch.org* were contacted by email with an invitation to participate. Through online research and discussion with expert informants involved with CSF research and associated with Duke University, five additional CSFs not currently listed as members of the *LocalCatch.org* network were identified, and were also contacted by email with an invitation to participate in the research. As a result, all 39 CSFs known to be operating in the United States and Canada at the time of the research were invited to participate. In 17 cases, the invited CSF either did not respond, declined to participate or logistical difficulties prevented the interview from taking place. Accordingly, interviews with 22 CSFs were conducted for the purpose of this research.

The names of CSFs have been coded for anonymity (Table 1). Codes refer to the state or province in which the CSF is based. For example, NC1 refers to the first interviewed CSF in North Carolina, NC2 the second etc.

Table 1. CSF Codes by Region

West Coast		East Coast		Island & Inland States	
CSF Code	Interviewee	CSF Code	Interviewee	CSF Code	Interviewee
AK1	Coordinator	MA1	Owner	HI1	Coordinator
AK2	Coordinator	ME1	Owner	IL1	Coordinator
BC1	Owner	NC1	Owner		
CA1	Owner	NC2	Owner		
CA2	Owner	NJ1	Coordinator		
CA3	Owner	NY1	Owner		
CA4	Owner	NY2	Owner		
WA1	Owner	NY3	Owner		
OR1	Coordinator	NY4	Owner		
OR2	Owner	SC1	Owner		
		HI1	Coordinator		
		IL1	Coordinator		

3.2. Interviews

All interviews were conducted between January 13, 2015 and February 23, 2015, either by phone or using Skype software for voice calling. Interviews were recorded digitally with permission of the interviewees, and handwritten notes were made during the conversation. Following each interview, the recording was reviewed and additional notes were made documenting the responses to all interview questions.

Interview participants included CSF operators, managers and coordinators. Most interviewees (n=16) were also the owner or founder of the organization, and some (n=5) were also the fisher for the CSF or the spouse of the fisher. Interviews lasted between 14 minutes and 71 minutes, with an average duration of approximately 30 minutes.

All interviews were conducted in a semi-structured format, allowing for the order of topics and interview questions to be adjusted to best fit the flow of conversation. This method of inquiry also allowed for a mix of open-ended questions and closed-ended survey-like questions (Bernard, 2011).

Interview questions were designed to gather data on the origins, goals, challenges, sourcing practices, distribution methods, and seafood sales of the CSF (see Appendix A for Interview Guide). The interviews were carried out in compliance with Duke University's Institutional Review Board (IRB Protocol #C0699).

3.3. Data Analysis

Reviewing the detailed interview notes and, where applicable, the audio recordings of the interviews, categories were created based on the range of responses received for each interview question. Categories emerged inductively from the data, upon review of all interview responses. The categories are intended to capture the central topics in the response data and organize it in a way that allows for comparison of similarities and differences in the philosophy, structure and operations of CSF programs.

Once the topics in each response had been identified, and each interview response categorized accordingly, the categories were reviewed and, where appropriate, combined or subdivided. For example, the initial categories for the interview question below were as follows:

Interview Question: “Do you sell seafood only through the CSF program or by other means as well? If so, what are they?”

Response Categories: Farmers Markets, Brick & Mortar, Online Grocer, Subcontractor for CSA, Retail Stores, Restaurants, Wholesale, Buyers Club, Schools, Online Sales, Fish Buyers & Processors

Upon further review of these categories after the initial classification, however, the categories “Restaurants” and “Retail Stores” were determined to be subcategories of the broader category “Wholesale” and thus collapsed into one.

The final categorized responses were organized in using Microsoft Excel software and analyzed using basic descriptive statistics, such as frequency. Examples of responses that illustrated the final categories were extracted from the interviews and transcribed directly. These quotes were selected based on their representativeness of the category, as well as clarity and concision.

4. RESULTS

4.1. Emergence

All 22 interviewed CSFs began after 2008, with most (n=16) starting between 2010 and 2012. The majority of interviewees (73%, n=16) indicated that their business or organization was created, in whole or in part, specifically for the purpose of operating a CSF program. For example, one business said the CSF program had been “engineered from the beginning to be a big part of how we sell seafood” (NC2) even though the company was created to sell seafood in other ways as well.

Six organizations did not originate as CSFs and were in operation prior to the start of their respective CSF program. Three of these are non-profit organizations that started CSF programs as one way to help fulfill their overall mission, and three are family-owned and operated seafood business that added CSF programs to access new markets and revenue streams, as illustrated in the following excerpt:

"We were compelled by the CSF model when it originally came out, partly because we were catching fewer fish compared to years past, and were having trouble selling fish to our normal markets." (MA1)

The same interviewee indicated there has been a change in how CSFs have been created over time, with new CSFs now originating with the help of outside organizations rather than from the fishers themselves:

“From what I’ve gathered, over the course of time CSFs have changed from their original tone, to be something like companies, non-profits, organizations running them, using fishermen, helping fishermen. But we’re a family... we fish... we sell our fish through various markets... and one of them is our Community Supported Fishery. We do everything ourselves, we don’t have any outside administrative help... its all in the family.” (MA1)

4.2. Legal Organization

Five legal structures were identified as organizations operating CSF programs (Figure 1). Limited Liability Company (LLC) is the most common form of legal entity (50%, n=11),

followed by corporation (n=4), non-profit organization (n=3), sole proprietorship (n=2) and cooperative (n=1). One interviewee did not know how their organization was formally structured.

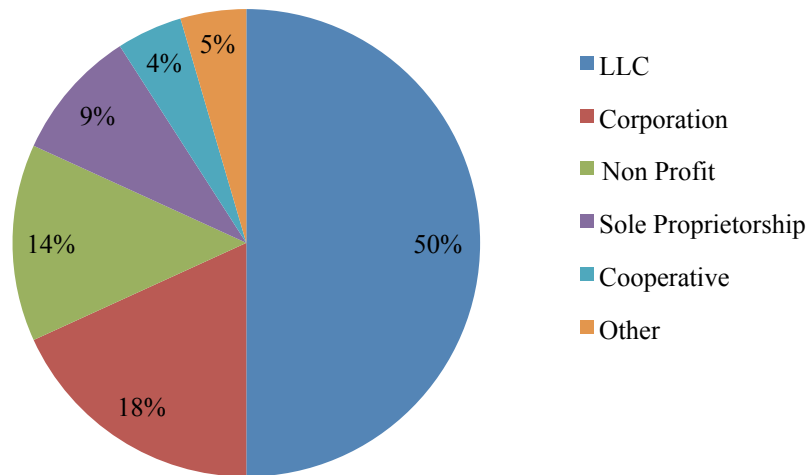


Figure 1. Legal structure of organizations operating CSF programs

One corporation mentioned the benefit of having a board of directors, which allows it to draw on the “expertise of distinguished individuals in our community as a way to ensure [the business’] longevity, and monitor and direct its trajectory” (CA2). Two organizations indicated the desire to move towards a model that allowed for greater fisher ownership, such as a cooperative or an LLC with both investor-owned shares and fisher-owned shares.

4.3. Goals

There was a wide range of responses concerning the goals of CSFs (Figure 2). Although there was considerable overlap between the stated goals of the 22 CSF programs considered, no two organizations expressed the exact same goals for their CSF program.

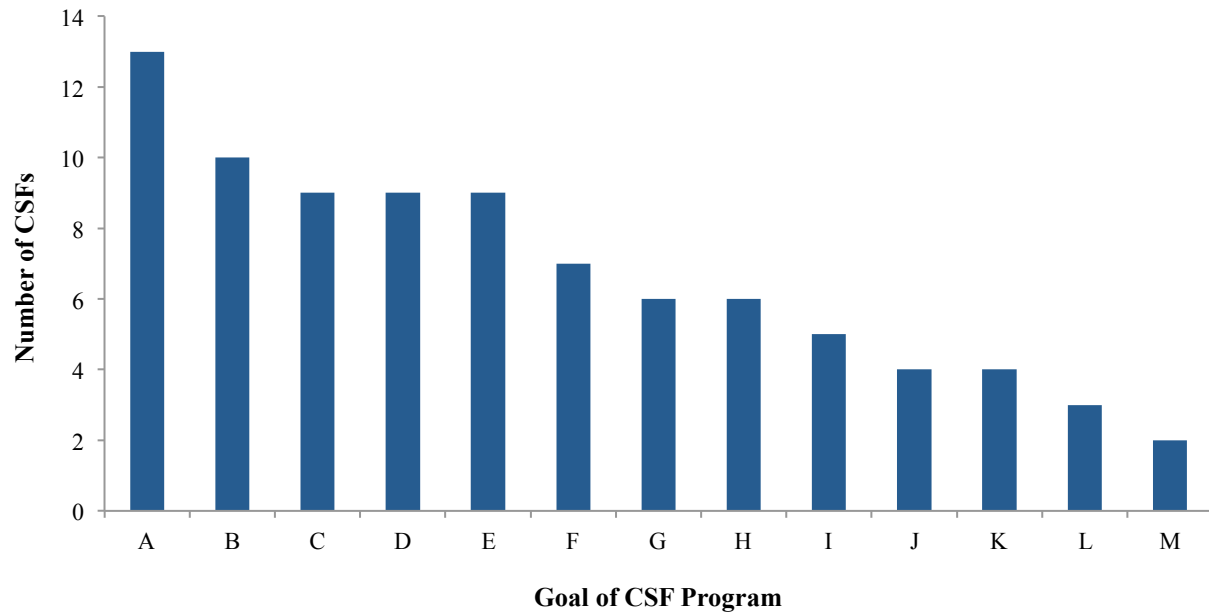


Figure 2. Stated goals of CSF programs: (A) Connect Fishers & Consumers; (B) Promote Local Seafood; (C) Environmental Sustainability; (D) Higher Price to Fisher; (E) Access to Local Markets; (F) Raise Consumer Awareness; (G) Increase Consumer Access; (H) Promote Small-Scale Fisheries; (I) Community Development; (J) Supply High Quality Seafood; (K) Earn Profit; (L) Promote Underutilized Species; (M) Decrease Food Miles

Shortening the supply chain and directly connecting fishers with seafood consumers was the most commonly expressed goal (59%, n=13). Several interviewees discussed the benefits of a shorter, more direct supply chain, particularly in terms of transparency, as illustrated in the following two excerpts:

“We have the whole chain of custody, people know what they are getting.” (OR1)

“The original idea [behind CSFs] was that fishermen were going to hand their fish directly to the consumer, that it was the most transparent supply chain... the most direct route for the consumer to know where their food was coming from.” (MA1)

Another interviewee explained the consequences of a long seafood supply chain for the fisher and the consumer:

“The way the traditional chain of custody works is that with each set of hands that touches the seafood, the price goes up a little and the quality goes down, so as the chain of custody continues along, prices are going up and quality is going down, but the price

to the fishermen at the beginning of that chain is the same. So what the end consumer can be left with at the end of a longer chain of custody is a very high price, low quality seafood that reflects poorly on the fishermen, when really it's the chain of custody that is causing that." (NY2)

Promoting local seafood was a stated goal for 45% of CSF interviewees (n=10) and two CSFs specifically mentioned trying to decrease food miles. One interviewee emphasized how promoting local seafood decreases the need for imported seafood:

"[We focus on] keeping local seafood local, bypassing the global distribution system that we know is responsible for a lot of bad things, so our goal is to regionalize our food system." (CA2)

Environmental sustainability is a stated goal for 41% of CSFs (n=9). Six CSFs (27%) also mentioned promoting small-scale or low-impact fisheries, and three (14%) specifically mentioned promoting the use of underutilized species, as reflected in the following excerpts:

"We believe we should be applying light harvest pressure to the whole ecosystem, and not narrowly focusing on specific species, so... we try to include as many species as possible... the end goal being that we don't focus our harvest pressure on one specific species and harm that stock." (NY2)

"[It's] our way of lessening the pressure on species like grouper, that are easily overfished, and opening new markets for species that are in better shape, taste just as good, and there just hadn't been markets developed for it." (SC1)

Six CSFs (27%) aim to increase consumer access to particular types of seafood (i.e. sustainably harvested or local). Four CSFs (18%) aim to supply consumers with fresh, high quality seafood products, and seven (32%) attempt to increase consumer awareness around fisheries and seafood. The following quote from one interview demonstrates how a CSF program may help raise consumer awareness:

"[Consumers are] not only buying seafood, but they are buying the experience of eating or participating in an operation that is supporting seasonality through the kind of way seafood is available." (NC1)

Paying fishers a higher price for their catch is a goal for 41% of CSF programs (n=9). As one interviewee explained, in the traditional seafood supply chain fishers face a great deal of uncertainty in the price they will receive for their product:

"Fishermen [traditionally] really have very little control over what the ex-vessel price ends up being and where their product goes, and what forms it takes, so the goal of the CSF is just to eliminate all of that uncertainty, eliminate being on the receiving end, and the lowest rung of commodity sales of this product." (WA1)

Gaining access to local markets for seafood products is a stated goal of nine CSF programs (41%) and increasing profit was mentioned by four CSFs (18%). For example, one CSF owner said the goal, simply put, is "to make more money off of less fish, and to keep the fish as local as possible" (SC1).

Community development and support for fishers is a goal for 23% of CSF programs (n=5). One CSF owner noted that following the implementation of their CSF program, fishers have started to receive "a lot of recognition and thanks and accolades in the community for the work they do, [which until now] hasn't happened for a couple of generations" (NY2).

4.4. Other Seafood Outlets

Two of the interviewed organizations *only* sell seafood through their CSF programs; all other organizations also use other outlets to sell seafood (Figure 3). The benefit to having multiple outlets for seafood was explained by one interviewee as follows:

"[We have been told by fishermen] that one of the draws of selling to a certain buyer, whether it is a wholesaler or single restaurant or CSF, is 'can you guys buy my entire catch because I don't want to drive to 5 different restaurants selling my catch and it takes me the whole day; if I can go to one restaurant and they're going to buy 200 pounds in one shot, then I would rather go to them even if their price was one or two dollars less.' So that is one thing we want to do – we want to support the fishermen in that way so they don't have to waste their time driving around, we want to buy their entire catch right off the boat, and then all they have to do is come in, sell us their catch and go home. In doing that, hopefully we can use our restaurants to push out the excess fish that the [CSF] customers don't take." (HI1)

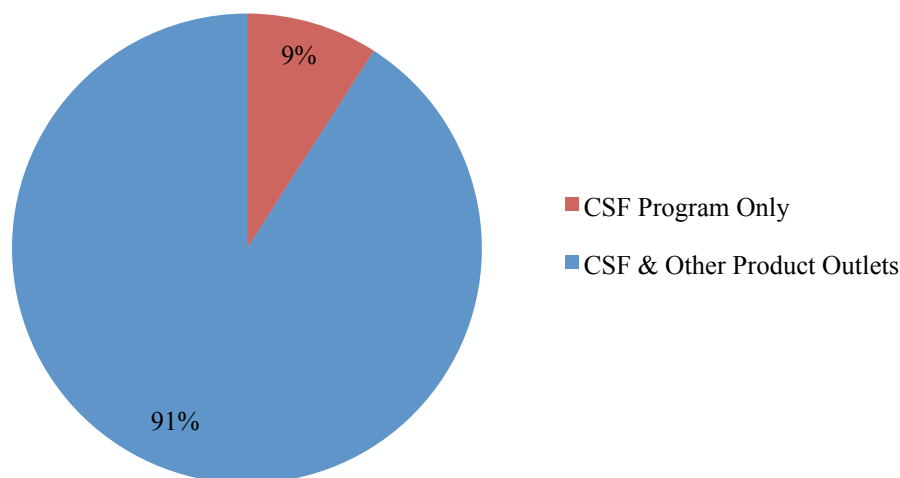


Figure 3. Organizations with CSF program as the only outlet for seafood products and organizations with CSF programs with other outlets

Of the other outlets for products, wholesale was the most common, with 73% of organizations (n=16) selling seafood wholesale in addition to selling it through the CSF (Figure 4). Restaurants in particular were the most frequent type of wholesale outlet, mentioned by 50% of interviewees (n=11), and retail stores were mentioned by 32% of interviewees (n=7). Several interviewees stressed the importance of the relationship between restaurant sales and CSF sales in creating demand for unique and usual types of seafood. For example, one interviewee explained that demand for underutilized species, such as those in their CSF boxes, is closely tied to the fact that restaurants in the region are also purchasing the same unique types of seafood from their company, which helps generate attention and appreciation for these species:

“The way our restaurant and CSF have played off of each other in our case has been key to our success... We are very fortunate... that [our city] has had a huge restaurant renaissance, and we have James Beard award winning chefs and restaurants... and they were opening their restaurants at the same time we were starting [our CSF], it was like a perfect storm. A few of these award-winning chefs were our customers right away, because of course they wanted the best product, and they would ask [us] 'what can you give me that no one else has.'” (SC1)



Figure 4. Other non-CSF program outlets for seafood products

Subcontracting with a local CSA program to sell seafood in conjunction with CSA shares was mentioned by 23% of organizations (n=5), and 18% (n=4) mentioned retailing at local farmers markets. Three organizations sell seafood products through an online grocer, such as *Good Eggs*, an online delivery service for locally harvested products. Several other product outlets were mentioned less frequently, such as selling seafood to schools (5%, n=1), buyers clubs (5%, n=1), local processors (9%, n=2), online through their own website (9%, n=2) and retailing product through their own brick and mortar store (5%, n=1).

For organizations with product outlets in addition to their CSF program, the relative importance of these other outlets to their business varied (Figure 5). For 55% of organizations (n=11) the CSF program accounts for the greatest proportion of their sales and is financially the most important part of their business. For 35% (n=7), the CSF is a smaller proportion of their sales in comparison to other outlets, and for the remaining 10% (n=2), all outlets are equally important to their business. One organization that runs a brick and mortar seafood store and also sells seafood wholesale to restaurants and retail stores explained the importance of having multiple outlets in addition to running a CSF program:

“They all support one another, because when you're working with fresh and perishable products, you need to have multiple outlets to move it.” (NY3)

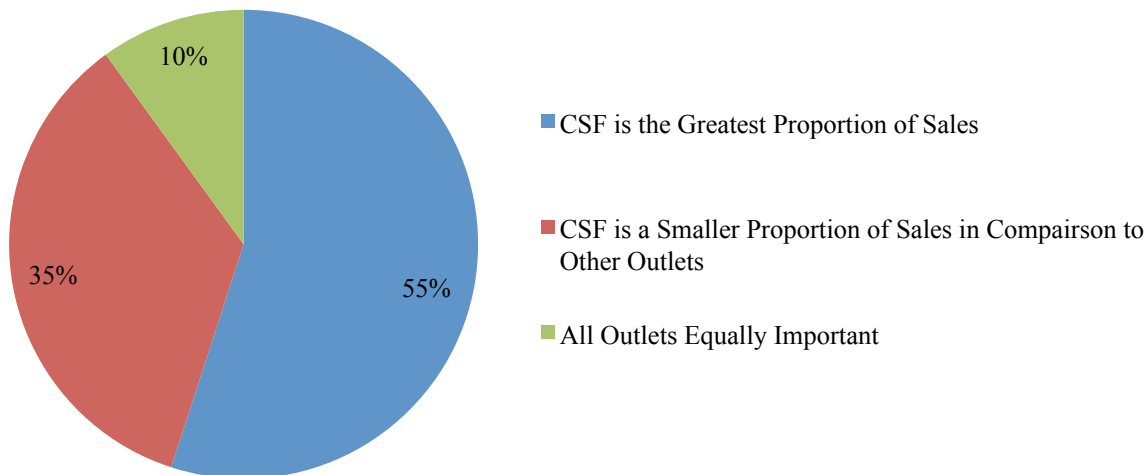


Figure 5. The relative importance of the CSF program and non-CSF outlets (i.e. wholesale) to the business

Nine organizations (41%) also mentioned non-financial benefits to having the CSF program, regardless of whether it was of material importance to their business. The benefits identified by interviewees include building a greater connection to the community, telling the story of the product to consumers, building stronger relationships with fishers, building stronger relationships with consumers, and attracting new customers to their business. The following two excerpts reflect this sentiment:

"Anytime we can sell our fish directly to a consumer, over the dock, off the boat, it is the most important sale we can make." (MA1)

"If you win with the CSF, it's a big victory for the whole concept of being connected to what's in season and locally available, and understanding things you're not familiar with and understanding natural variations in what happens throughout the year." (NC2)

4.5. Consumer Commitment

CSF programs require varying levels of commitment from consumers, both financially and temporally (Figure 6). Some CSFs offer more than one option. A subscription system, in which the consumer pays in advance and commits to seafood deliveries or pick-ups for a predetermined length of time, is the most common type of system employed by CSF programs; 73% (n=16) of CSFs in the study require the consumer to subscribe as a condition to participating in the CSF (Figure 6). The required commitment for these subscriptions ranged from 4 weeks to 24 weeks.

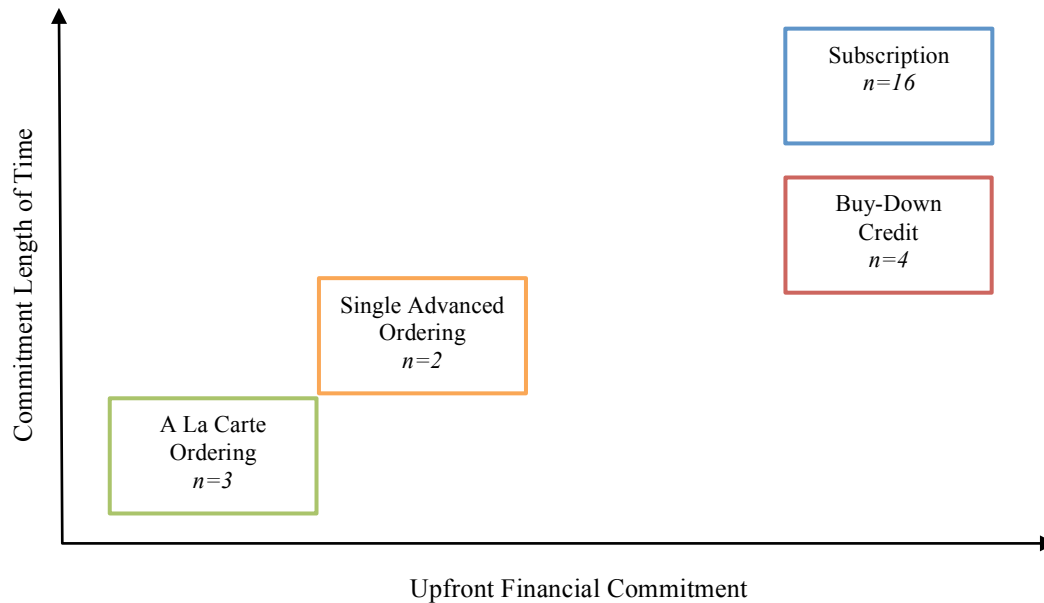


Figure 6. Occurrence of the varying degrees of commitment required of CSF consumers as a condition of participating in the CSF program

While still requiring an upfront financial commitment from the consumer, but without the commitment to regular deliveries of seafood, three of these CSF programs (14%) offer subscriptions with flexible terms, such as allowing consumers to select a series of non-consecutive weeks to receive their seafood, or offering customers the option of placing their subscription on indefinite hold without penalty. Four CSFs (18%) use a buy-down system, in which consumers pre-purchase a credit for the season and apply it to seafood purchases from the CSF when they choose, similar to a pre-paid credit card, allowing consumers flexibility with when they receive the seafood. Two CSFs (9%) offer single deliveries of seafood where orders are placed in advance and payment is made upfront, but without any long-term or consecutive-delivery commitment. Three CSFs (14%) offer consumers the option of ordering ‘a la carte’ style, with no advance ordering or upfront payment required, essentially emulating a retail outlet.

The two benefits most frequently identified by interviewees in connection with the selected level of consumer commitment in their CSF program are (1) planning and predictability (50%, n=11) and (2) consumer satisfaction (32%, n=7). However, these benefits were mutually exclusive; a

CSF that identified planning and predictability as a benefit did not also cite consumer satisfaction as a benefit, and vice versa.

Of the thirteen CSFs that require a non-flexible subscription, a majority (62%, n=8) indicated the benefit to be the ability to plan ahead and predict demand for the purposes of ordering product (Figure 7). As explained by one CSF, the upfront commitment from consumers “allows us to project forward and give fishermen a kind of consistent buying relationship” (CA4). Customer satisfaction was mentioned by 23% (n=3) of the CSFs, followed by simplicity, providing the lowest price to the consumer and remaining true to the CSA model, which were each mentioned by 15% (n=2) of the CSFs. Those that mentioned remaining true to the CSA model implied that unlike some of the emerging CSF arrangements, the ‘original’ subscription based model maximized the benefits to fishers, such as is explained by the following interviewee:

“We’re remaining true to the philosophy of community supported agriculture or community supported fisheries, and the benefits that flow from that... by eliminating that whole chain [of custody] and by staying true to the community supported fishery philosophy and model, we’re able to deliver the highest quality and lowest price seafood to our members, and we’re able to deliver the highest dollar at the dock to our alliance of fishermen.” (NY2)

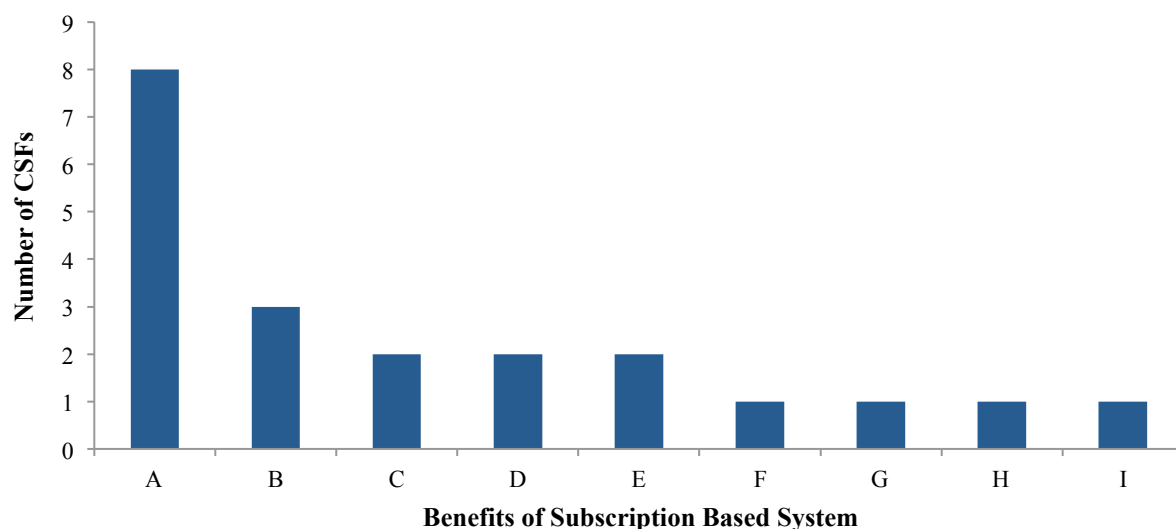


Figure 7. Stated benefits of using a rigid commitment structure (subscription based system): (A) Planning & Predictability; (B) Consumer Satisfaction; (C) Simplicity, Minimize Logistics; (D) Lowest Cost to Consumer; (E) Remain True to CSA/CSF Model; (F) Financial Security; (G) Quality & Freshness of Product; (H) Minimize Waste; (I) Highest Profit for Fishers.

Of the CSFs that offer either a flexible subscription or buy-down system (n=6), 50% (n=3) mentioned that a benefit to doing so was the financial security of receiving payment upfront, and 50% (n=3) mentioned consumer flexibility and customer retention as a benefit (Figure 8). One CSF mentioned that the upfront financial commitment of the buy-down system allows them to plan ahead for the season, such as making necessary boat repairs. One CSF also mentioned that they opted for the buy-down system as a way of following the traditional CSA model, similar as mentioned above.

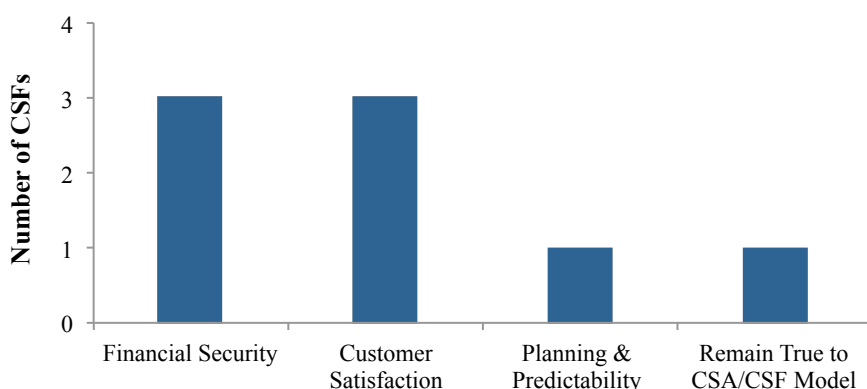


Figure 8. Stated benefits of using a flexible commitment structure (buy-down credit or flexible subscription system)

4.6. Species Included in CSF Box

A majority of CSFs (86%, n=19) source and sell fresh seafood products, and most (68%, n=15) do so exclusively. Some CSFs (23%, n=5) sell frozen seafood, while others (14%, n=3) sell preserved seafood, such as smoked, canned, or vacuum-packed products.

One CSF (5%) allows consumers to select the species they would like and sources accordingly. Five CSFs (23%) only target and include a few select species, such as salmon, scallops or lobster, in their CSF boxes, and no customization of species is offered to the consumer.

The remaining sixteen CSFs (73%) do not select particular species, and instead decide on what to include in the box based on whatever is caught. Of these, varying degrees of customization are available to consumers (Figure 9). Six (38%) do not offer customers any choice in the species of seafood that is provided in the box, and whatever is caught that day or week is what consumers

will receive. Eight (50%) offer some degree of customization by consumers, such as offering boxes without shellfish or crustaceans, or shares without ‘unusual’ seafood species. Two (13%) allow customers to fully customize their boxes, as they operate on the buy-down system and consumers have the option of electing to purchase whatever is in the catch that day, or opting to wait for another catch, and in that way are given a choice in the species of seafood they receive.

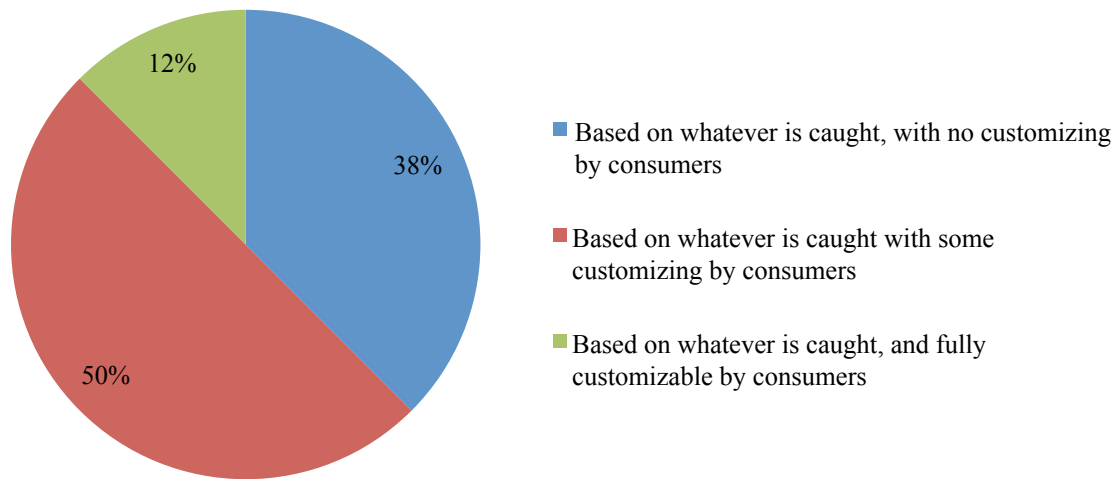


Figure 9. Consumer ability to choose species and seafood type in their CSF box

For CSF programs that determine the species for their boxes based on whatever is caught, most (63%, n=10) commented that doing so allows them to operate in a way that is supply driven, rather than demand driven, thus increasing certainty in an unpredictable industry. The following excerpts from two interviews illustrate this:

"Fishing is an unpredictable business, and with ocean conditions, different availability of species, not everything is available all the time." (OR1)

"The real magic of a community supported fishery is that we live in a demand-based marketplace, and seafood does not operate like that; demand-based marketplaces work really well for things like nuts and bolts at Home Depot, that can just sit there for a long, long time, but for a highly perishable goods like seafood, there are all of these variables on the dockside of the equation... the weather, the regulations, are fish biting, seasonal migration patterns. So historically, in a demand-based market, that has been met with all these variables on the *buy* side, is that fish trending, is it a religious holiday, do people want to eat what you caught. So the market is really broken in this country...[we are] trying to match a really volatile series of sporadic, unpredictability [factors] from the fishermen with the unpredictability of the consumer, and inevitably that forces you to

hold a big inventory to try to match that demand, or keep some kind of supply. The magic of a CSF... is that... there's always going to be variables on the fisherman side... we've eliminated all of the variables on the buy side. On the consumer side, we are agreeing to a supply based economy, where all of our benefits flow. People are surrendering their right to demand and saying we're willing to accept what our ecosystem is providing." (NY2)

Six of these CSFs (38%) also mentioned environmental benefits to basing the species in their box on what is caught, either by diminishing waste or reducing the impact on the ocean by consuming a greater range of species. This is reflected in the following excerpts:

"The market should be commensurate upon what's going on in the ocean, the health of ecosystem, the abundance of the species for that year class and for that season, and it shouldn't be the other way around because, in the end, you're going to reap the ocean dry." (MA1)

"We believe we should be applying light harvest pressure to the whole ecosystem, and not narrowly focusing on specific species, so... we try to include as many species as possible for the end goal being that we don't focus our harvest pressure on one specific species and harm that stock." (NY2)

Four of the sixteen CSFs (25%) that determine the species in their box by whatever is caught mentioned that selecting species based on supply also allows them to supply consumers with the freshest possible product, as described by the following interviewee:

"To get the freshest possible seafood to consumer, whether it's a chef or CSF customer, they've got to be flexible because...it's Mother Nature." (NC2)

Consumer satisfaction was identified as another benefit of restricting the species included in the box to whatever is caught, mentioned by four of the sixteen CSFs (25%). Doing so eliminates the burden of choice for consumers, as explained by one interviewee:

"[We found] people were really overwhelmed, so they chose not to eat seafood because of all the mixed messages out there, so we're taking out the guesswork and providing them with something that we guarantee is fresh and local and sustainable." (CA4)

Most CSF programs (77%, n=17) do choose to exclude certain species from their boxes, rather than including *everything* that is caught and available to them. Of these, 41% (n=7) exclude

certain species according to consumer preferences, and another 41% (n=7) exclude them for sustainability reasons. The market value of the species is also a factor, with 29% (n=5) excluding species because their value is too high, and 18% (n=3) excluding species because their value is too low. Other reasons mentioned for excluding species included the challenges of obtaining the necessary volume to include them in CSF boxes, the difficulties in processing certain species, and the fact that there are other markets available for the excluded species.

4.7. Seafood Sourcing

Of twenty-two CSFs in the study, four (18%) only source seafood they harvest themselves, while most (82%, n=18) source from a number of fishers, ranging from 5 to 63 and averaging approximately 24. Nine CSFs (41%) only source directly from the fishers, and an additional seven (32%) source directly from fishers when possible (Figure 10). One interviewee explained that working with a greater number of fishers allows them to provide greater species diversity in their boxes, and in turn, satisfy their consumers:

"You've got to have to have a network of fishermen to pull off enough variety to make people happy. A lot of CSFs have had a challenge with the 'mullet dilemma,' I've heard it called, they're just too limited in their sources." (NC2)

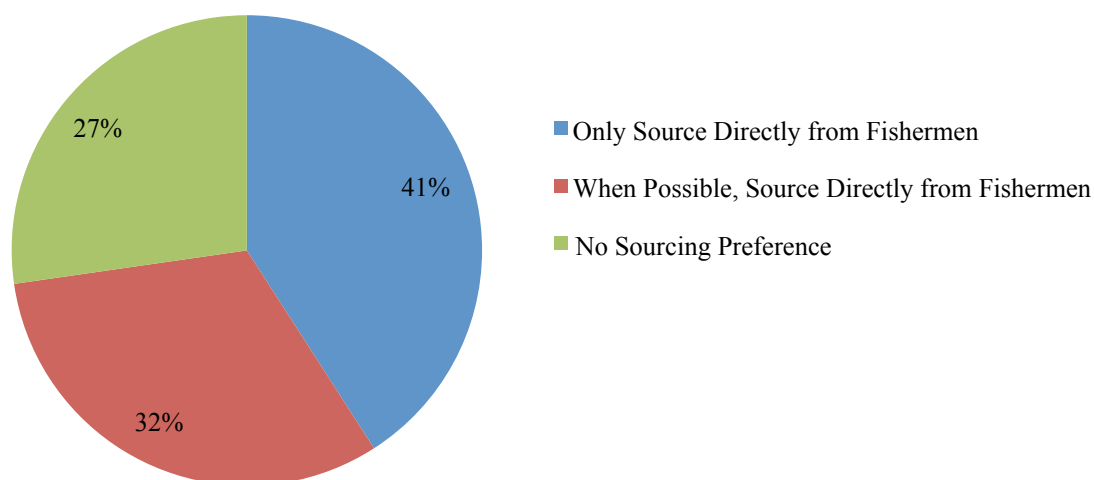


Figure 10. CSF sourcing preferences

In addition to sourcing from individual fishers, 36% of CSFs (n=8) source seafood from local processors, 18% (n=4) from fisher cooperatives, and 18% (n=4) from other seafood businesses.

With respect to where seafood is sourced, 82% of CSFs (n=18) consider their product to be sourced locally. However, definitions of the term ‘local’ varied substantially between CSFs (Figure 11), and one interviewee pointed out that the "definition of ‘local’ is so skewed with how world economies work now" (WA1). To define the term ‘local’, 68% of CSFs (n=15) base it on where the product is landed, 55% (n=12) base it on where the product is caught or harvested, and 27% (n=6) base it on a particular number of miles from consumers. Examples of the definitions given for the term ‘local’ are provided below:

"If it's landed in our port, then that is local fish to us." (NY2)

"Our [fish] never had to get on any vehicle to get to our customers... there were no wheels involved at all, other than the customer driving it to their house, so I don't think it gets more local than that." (SC1)

"I scooped it up with my hands in the waters a mile from the dock where we sell our fish." (MA1)

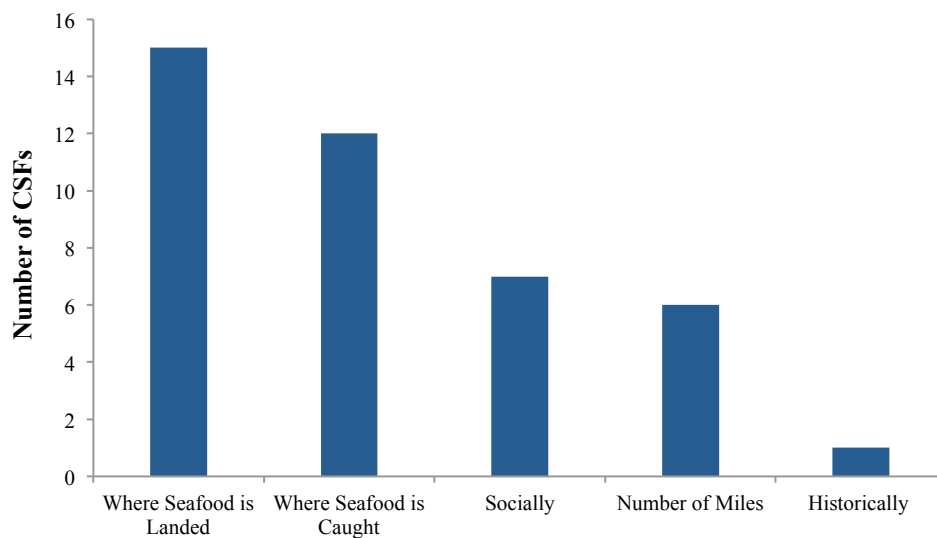


Figure 11. Definitions for the term ‘local’ according to CSFs

When defining ‘local,’ some interviewees also mentioned non-geographic factors.

Approximately one third of CSFs (32%, n=7) define the term in a social context, such as where the fishers live. The following excerpts illustrate some examples of socially-defined locality:

"Local is not necessarily just where the fish is being sourced, in my mind its also the fact that the fishermen call this place their home." (HI1)

"Its community based, its harvested in those waters, its landed in the ports along the shores of those waters, and sold directly to the community members and the community along those shores, and the money recycles back into the community... local is local, literally local." (MA1)

"The fishermen are local, but sometimes the fish are not." (CA1)

One CSF also uses historical factors to define what constitutes local:

"The population in [here] is very dispersed. And people traditionally, traditional people ... traded their fish all the way into the [surrounding inland regions] for other products, and so this is something that has been going on for thousands of years, inland people do consume seafood, but they don't typically consume seafood from half way around the world, they consume it from their nearest bodies of water, so that's how we consider it to be local." (BC1)

4.8. Distribution

To distribute seafood to consumers, 86% of CSFs (n=19) use pickup locations, while the remaining 18% (n=4) offer home delivery of shares to consumers. The frequency of the distribution ranges, with 59% of CSFs (n=13) offering weekly distributions, 36% (n=8) offering a bi-weekly or bi-monthly distributions, 18% (n=4) offering monthly distributions and 9% (n=2) offering seasonal distributions (Figure 12). Three CSFs (14%) do not distribute seafood at regular intervals and instead provide opportunities for consumers to pick up seafood as it becomes available.

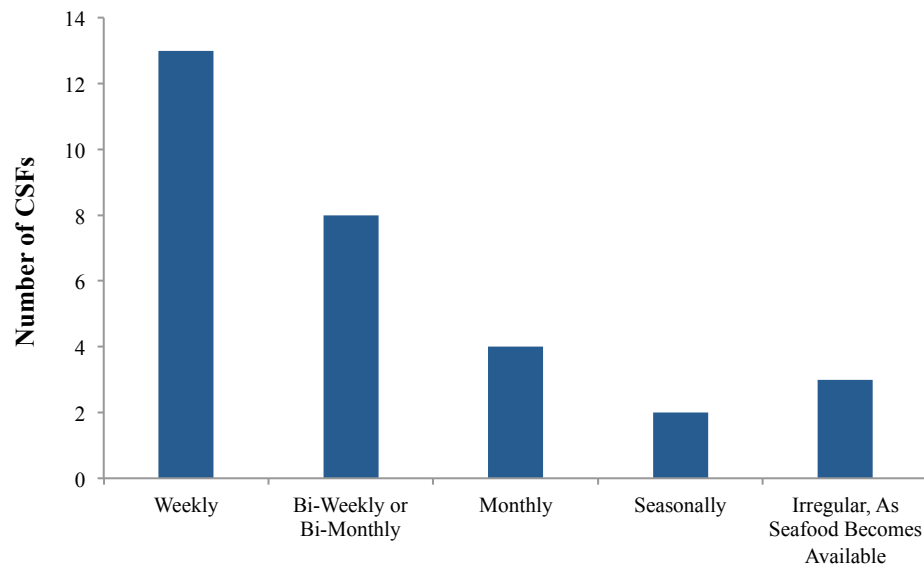


Figure 12. Frequency of seafood distribution

4.9. Challenges

One of the most commonly mentioned (27%, n=6) challenges to selling seafood through a CSF program identified by interviewees was the workload associated with running a CSF program (Figure 13). In this regard, interviewees often mentioned that operating the CSF was a second job, and was a lot of work on top of maintaining another form of fulltime employment. Others discussed workload challenges in terms of the CSF being only one of the many things their organization does, and thus finding time to run the CSF on top of the other aspects of their job is a challenge.

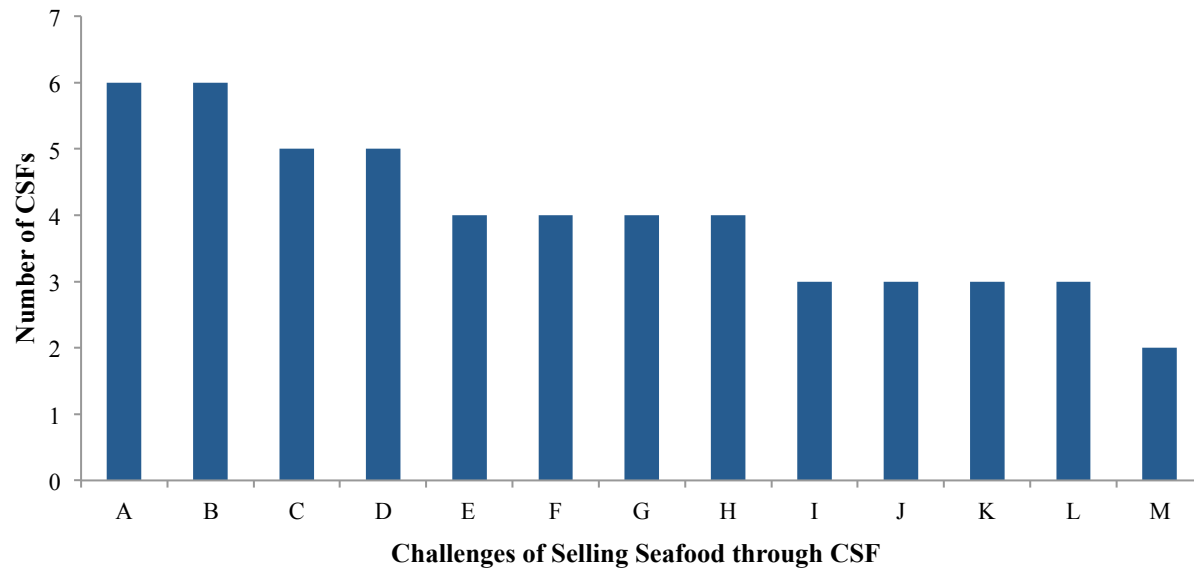


Figure 13. Stated challenges of selling seafood through a CSF program: (A) Marketing & Branding; (B) Workload; (C) Costing; (D) Availability of Products Due to Weather; (E) Business Skills; (F) Meeting Customer Demands; (G) Competing with Other Industry Players; (H) Coordinating Logistics; (I) Processing & Cold Storage Capacity; (J) Sourcing Product to Meet CSF’s Standards; (K) Educating Consumers; (L) Regulations & Permitting; (M) Finances.

Also mentioned as a challenge by six CSFs (27%) was marketing and branding, referring to the difficulties organizations have encountered with limited funds dedicated to advertising, such as expressed by these two interviewees:

“We have no advertising budget, and so it’s really a word of mouth business.” (CA4)

“[Our greatest challenges is] getting the word out, we haven’t been very successful at getting media coverage or getting our name out there so that people know we exist.” (NY1)

Availability of products, specifically with respect to the unpredictable nature of the fishing business as a result of weather, conditions etc., and costing, or determining how to price products appropriately, were each also mentioned by five CSFs (23%). The following excerpts reflect the costing challenges experienced by CSFs:

“[Our biggest challenge is] putting a true price on how hard a direct marketing fishermen has to work to get product in the hands of his or her customers.” (WA1)

"Industrialized food system has created for our culture the perception that food is cheap... We're trying to encourage people that wild fish is a treasure... that large scale, wild seafood is the last wild food substance that we eat, and it's not cheap." (NY2)

Having the necessary business skills to run a CSF was mentioned as a challenge by 18% of CSFs (n=4), which included challenges with handling business' finances and having the necessary computer skills to handle a website and online sales.

Meeting consumer demands was also mentioned as a challenge by 18% of CSFs (n=4). For example, as the following interviewees explained:

"Balancing what's coming into our harbors with what consumers want is a challenge." (CA2)

"It all comes down to the consumer, what are they willing to eat. We have to do a good job presenting everything to them... The biggest challenge is getting our consumers to embrace the program, understand the value, and be willing to try new things." (NC2)

Also mentioned as challenges associated with selling seafood through the CSF include: competing with other players in the seafood industry, such as large scale seafood businesses (18%, n=4), coordinating logistics of the CSF (18%, n=4), sourcing products that meet their organizations buying standards, such as 'sustainable seafood' or 'hook-and-line caught fish' (14%, n=3), processing and cold storage capacity (14%, n=3), educating consumers on seafood (14%, n=3), handling permitting and regulations (14%, n=3), and finances (9%, n=2).

5. DISCUSSION

5.1. CSF Variability

As the CSF model continues to gain popularity among both consumers and harvesters, achieving a clearer understanding of the diversity of CSF programs is an important first step to bringing consistency and continuity to how we use the term ‘CSF’, and how we discuss the benefits these arrangements can provide. There are several drivers of diversity in CSF arrangements:

(1) Lack of Standardization of CSFs

The ‘CSF’ term is a self-adopted label and there are currently no formal regulations around what is, or should be, considered a CSF. The definition of a CSF has been left open to interpretation, and unrestricted use of the term has resulted in a variety of organizations self-classifying as CSFs.

Organizations may have an incentive to adopt the term, regardless of whether or not they fully identify with the principles of the CSF movement; the label alone may attract consumers who link the term to particular cultural values or an idealized type of relationship with fishers. Parallel arguments have been made for the growth of CSAs in the United States, including the suggestion that CSAs represent a modern manifestation of American pastoralism (Press & Arnould, 2011) and, when applied to food systems, the term ‘local’ evoking images of small, independent or trustworthy farmers (Ostrom, 2006). It is possible that the term CSFs also reinforces elements of an ideology that appeals to consumers and as such, has gained legitimacy. One interviewee supported such a perspective:

“To be a CSF you gain a lot of acceptance and excitement from people who want to align their values with what a CSF stands for, so you have a lot of different business models trying to pretend and ‘dress up’ [as a] CSF when they really are not.” (NY2)

Given the high degree of variability identified in CSFs, standardizing the term presents a number of challenges. How a CSF *should* be defined is currently a matter of opinion. Even CSF organizations that self-classify as ‘true’ CSFs have diverging ideas of how to standardize the model, as illustrated in the following two excerpts:

“Some dealers who have retail space have created, or simulated, what they *believe* are CSFs, which are actually buyers clubs, because a true CSF is fishermen driven, its not a top down approach from a retailer or wholesaler, it has to come from the fishermen.”
(MA1)

“The way we mathematically quantify how you say who *is* and who *isn't* is by the chain of custody... Here's the basic math: you just count the chain of custody, how many hands it touches from the actual harvester, and anything beyond three is no longer a [CSF].”
(NY2)

Similar challenges with the lack of standardization and regulation have been observed with CSA programs in the United States. The rapid growth and expansion of the CSA model over the last several decades recently prompted California to create a statutory, legal definition of the term ‘CSA’ and to establish formal regulations to regulate the development of CSAs, the first state in the U.S. to do so (Grant, 2013). Similar legislation may prove to be useful for CSFs as they continue to gain traction in the market.

(2) Differing Goals of CSFs

CSF programs are often assumed to share a common set of goals. According to Brinson et al. (2011): “The main goals of the CSF model are to increase profits for the local fishermen, provide high-quality seafood to interested consumers, and directly engage consumers using fishery products.” However, as the results of this study suggest, not all CSF programs aim to achieve these goals. Less than half of the CSFs interviewed stated that providing fishers with a higher profit for their catch as a goal, and only a few mentioned providing consumers with high-quality seafood products as a goal. Moreover, promoting local and sustainable seafood, gaining access to local markets for seafood products, raising consumer awareness and promoting small-scale fisheries were all just as common as the goals mentioned by Brinson et al. (2011).

CSF program goals are intended to dictate, at least in part, the structure and operations of the arrangement, and consequently the benefits the particular CSF can provide. For example, one CSF aims to provide high quality, transparent seafood from Alaskan fishing communities to consumers in the Midwest. In order to achieve this goal, the organization ships seafood to consumers over 4000 kilometers from where it is harvested. While this type of operation contradicts the core principle of the ‘locavore’ movement that is often associated with CSFs (i.e.

Conniff, 2014; NOAA Fisheries, 2012; Northwest Atlantic Marine Alliance, 2014), it allows the CSF to achieve its particular goals, which is something that they believe ultimately honors the purpose of CSF programs:

“Some members get it ... but we definitely have other members who just want really good seafood and would never even know the word ‘CSF’, they just know we’re a home delivery service for fish... we have to balance our motivations [with] what the marketplace is, so we have taken the inspiration from community supported food model, but... gone a bit more mainstream. [We] then work internally... to provide new opportunities for fishermen and [create] value generation in that way.” (IL1)

Terms that are commonly used to describe the goals of CSF programs, such as ‘local’ and ‘sustainable,’ are themselves ridden with variability, which leads to yet another layer of diversity in CSF operations; CSFs with similar goals may in fact be pursuing very different outcomes in practice. As the results of this study indicate, the term ‘local’ can be defined in a number of ways, and as such, even CSFs that aim to promote ‘local’ seafood may be delivering very different products – a CSF program that defines ‘local’ as fish caught within a few miles from where consumers reside will operate differently than a CSF that defines ‘local’ as where the fishers live.

The same is true for the term ‘sustainable.’ CSF programs can pursue sustainability goals in a number of different ways, such as reducing food miles, creating markets for bycatch and waste products, and promoting lower-impact fishing gear (McClenachan et al., 2014). The particular elements of sustainability pursued by a CSF will influence the practices of the program. One CSF in California, for example, aims to improve sustainability by supporting fishers that use fixed gear, such as hook and line, while another in Alaska does so by attempting to keep locally caught seafood that would otherwise be exported available to residents in the local community. Although both support ‘sustainable’ seafood, the unique goals of each CSF program will ultimately dictate how it operates – one sources fish caught using a particular method, while the other sources fish caught in a particular place.

(3) Differing Local Contexts for CSFs

CSFs are also constrained in what they can do based on the local context within which they operate. Shellfish harvesters in Massachusetts, for example, are prohibited from selling their products directly to consumers; state law requires harvesters only sell shellfish products to wholesale dealers permitted by the Division of Marine Fisheries and the Division of Food and Drugs (Massachusetts Department of Public Health, 1999). While CSFs are typically considered a direct-to-consumer marketing strategy that connects consumers directly with fishers, regulations in Massachusetts prohibit some fishers from doing so, and as such, require intervention by a third party.

Regional fishing regulations may also shape the operations of a CSF. For example, CSF programs that provide salmon from Alaska are restricted to a short fishing season during the summer. As a result, CSF owners and operators have, in some cases, tried to find innovative ways for their CSF to generate revenue streams that extend beyond the short fishing season, such as selling ‘freezer shares’ of preserved product throughout the year. In places where fisheries are highly targeted and generate low bycatch to begin with, promoting underutilized species may not be relevant, and selling high-value species such as salmon may make the most sense given the fishery in which the CSF operates.

In some locales, consumers may already have direct access to fresh, high quality, local seafood, and CSFs may instead serve another purpose. For example, both CSFs in North Carolina focus primarily on providing seafood to communities of inland consumers located in urban centers, rather than serving the coastal communities where it was caught. One CSF in Oregon is set in a similar context; it has tailored its CSF program to the local community, as explained by the program coordinator:

“[We are] three to three and a half hours away from any populated community. We’ve found that for people that live on the coast, everyone knows a fisherman, everyone has access to fresh seafood, so we had to start our program in areas where there are people, and unfortunately people are far away from [where we are located].” (OR1)

The broader food landscape within which the CSF operates is also a factor. In places where seafood has not generally been accessible or popular, promoting the consumption of even the most mainstream seafood products may be a challenge, let alone the more unfamiliar or uncommon species. In these ‘non-seafood’ areas, consumers may only have experienced seafood in restaurants and would likely be unfamiliar with cooking it. In these cases, a CSF may need to take into account the culinary skills and experiences of their consumers and select species that are relatively easy to prepare. Restaurants also play an important role in the local foodscape, and may contribute to what a CSF is able to offer. One CSF in South Carolina, for example, has had great success marketing underutilized species through their CSF program, in part because of the support of local chefs in the area who have taken the opportunity to promote the same species on their menus.

(4) Differ Product Outlets of Organizations with CSFs

CSFs are not necessarily stand-alone institutions or organizations. Rather, CSFs are *programs* – strategies employed by an organization to market seafood products. The results of this research indicate that nearly all organizations with CSF programs also sell products through other outlets, such as wholesale to restaurants and retail stores. The degree of diversification and relative importance of the CSF strategy to the business plays an important role in determining how that CSF program is structured.

The perishable nature of seafood makes holding an inventory of product difficult, particularly without compromising the quality or altering the form of the product. Having multiple outlets through which products can be sold helps to offset some of the risks associated with selling a perishable product. If a CSF program is either one of many product outlets through which an organization distributes its product, or the smallest volume of sales relative to the other outlets, advanced consumer commitment may be less critical. As a result, CSF programs that represent only one of several outlets for the organization may be able to offer more flexibility and choice to the consumer. The same is true for organizations that are able to create value-added products from excess seafood; one CSF in British Columbia, for example, is able to smoke or can any seafood that is not selected by CSF consumers. Having this option eliminates the need to know exactly how much seafood is needed for the CSF program.

5.2. Common Characteristics of CSF Programs

‘CSF’ is often used as a unifying term, implying a collection of programs with similar philosophies, structures and outcomes. While the term ‘CSF’ actually refers to a number of different arrangements, as illustrated in this study, there are several attributes that CSFs *do* share in common (Table 2).

Table 2. Summary of divergent and shared characteristics across all CSFs

Divergent Characteristics	Unifying Characteristics
<ul style="list-style-type: none">• Legal organization• Goals of CSF program• Types & importance of other product outlets• Consumer commitment• Seafood species included in CSF box• Seafood sourcing practices• Frequency & method of CSF box distribution• Challenges associated with selling seafood through CSF program	<ul style="list-style-type: none">• Shortened supply chains• Traceable chain of custody• Domestically sourced seafood• Effort to provide information to consumers about their seafood

(1) Shortened Supply Chains

Not all CSF programs operate as direct-to-consumer marketing strategies, in which the fisher sells seafood directly to consumers. Instead, many of CSF programs are actually intermediated marketing strategies, in which the seafood passes through at least one intermediate step in the supply chain before landing in the hands of consumers (King et al., 2010).

However, the characteristic shared by both of these strategies, direct-to-consumer and intermediated, is the emphasis on connecting seafood consumers and seafood producers (King et al., 2010). Even if CSF programs are not actually direct-to-consumer, as they are often promoted to be, and as many of their CSA counterparts are, they still differ from mainstream supply chains by attempting to establish meaningful connections between consumers and producers.

(2) Traceable Chain of Custody

All seafood sold through CSF programs is traceable to a specific fisher, boat or community of harvesters. CSF programs that operate as direct-to-consumer hold the entire chain of custody,

making it reliably simple to trace the product from boat to plate. But even CSF programs that operate as intermediaries between producers and consumers are conscious of the product's chain of custody, and can trace it back to its source.

The shortened chain of custody characteristic of CSF programs makes it easier to identify and follow the origin, processing history and distribution of a product through the entire supply chain (Borit & Olsen, 2012). Such accountability and transparency eliminates several of the issues associated with the lack of traceability in traditional seafood supply chains, such as opportunities for mislabeling and infiltration of illegally-caught seafood products (Oceana, 2015; Pramod et al., 2014).

(3) Domestically Sourced Seafood

While not all CSF programs provide *locally* sourced products, they do all offer *domestically* sourced seafood. In an industry dominated by imported seafood, the opportunity to provide a venue for consumers to purchase domestically caught products is not an insignificant feature. Most CSF seafood travels a fraction of the distance of conventional seafood, averaging 65 kilometers from boat to plate, compared to over 8800 kilometers for store-bought seafood in the United States (McClenachan et al., 2014).

The increasingly global nature of the seafood industry is displacing domestic fishers and pushing out many small-scale and community-based fishing operations in the United States. Supporting the consumption of domestic seafood through CSF programs can help to reduce the influx of imported products and preserve the livelihood of commercial fishers in the U.S. and Canada (Ellison, 2009).

(4) Provide Information to Consumers

All CSF programs provide consumers with access to information about the product they are purchasing, even those that do not specifically focus on consumer education and awareness as one of their primary objectives. This may include simply informing consumers of where the product was caught, how it was caught or who caught it; a significant improvement from seafood purchased through traditional supply chains. Some CSFs even go a step further and provide more

detailed information to consumers, such as the sustainability status of the species or broader habitat issues associated with the fishery. Unlike seafood guides and certification programs that also aim to inform consumers about seafood choices, CSF programs educate consumers about the specific fish they are purchasing, and help to eliminate conflicting recommendations by different guides or certification schemes (Olson et al., 2014).

Providing consumers with even the most basic information about their seafood increases overall awareness around regional fisheries, and also helps to raise the profile of fish in society. One interviewee explained the message they hope to convey to CSF consumers about the importance of wild seafood to our food system:

"Seafood is our last wild food source... and one of the most important foods in this discussion. Food is one of the best ways we connect to our surroundings and the people around us, and if we lose such connection to the wild and nature, we're going down this really uncharted path in terms of civilization, only eating, producing and supporting input based food systems like agricultural models." (CA2)

Informing consumers about their seafood can draw attention to fish as a food source, not just a natural resource. It can help raise awareness around the role of seafood in a safe, secure and sovereign food system (Jacquet & Pauly, 2007; Olson et al., 2014).

5.3. Classification of CSF Programs

Advocates of the CSF model are well advised to be conscious of the diversity of arrangements that this increasingly common term represents, and to account for this when commenting on how CSFs operate and what they are able to provide. Not every CSF is organized or structured in a way that supports the same array of benefits that are commonly associated with CSF programs; most CSFs are tailored to provide a sub-set of benefits, and very few, if any, are structured in a way would allow *all* potential benefits associated with CSFs to be achieved. A classification system differentiating types of CSF programs could help draw attention to this fact, and help ensure the potential outcomes or benefits of a particular CSF arrangement are presented accurately.

Three types of CSF programs have been identified based on the results of this study: (1) community driven, (2) harvester driven, and (3) species driven (Table 3). While CSF programs in a given category share many similarities in structure, operations and philosophies, not all characteristics common to the category will be present in every CSF; these programs must still be considered within the local context in which they operate.

Table 3. Classification of CSF programs based on shared characteristics

Characteristics	Harvester Driven	Community Driven	Species Driven
Ownership	Owned & operated by fisher	Owned & operated by an intermediary	Owned & operated by fisher or intermediary
Legal Constitution	LLC, Cooperative or Corporation	LLC or Corporation	LLC or Non Profit Organization
Goals	Goals are fisher-focused (i.e. paying a higher price to fishers)	Goals are consumer-focused (i.e. raising consumer awareness)	Goals are diverse
Importance of CSF	CSF is often the smallest proportion of sales	CSF is often the largest proportion of sales	CSF is often the largest proportion of sales and important to the business for non-financial reasons
Commitment System	Majority use a buy-down system	Majority use a subscription system with set pick-up times	Less likely to require a subscription, and often offer single advanced or a la carte ordering
Distribution Frequency	Seafood is distributed as it becomes available, rather than set intervals	Seafood is distributed on a weekly or bi-weekly basis	Seafood is distributed monthly, seasonally or annually
Distribution Method	Consumers pick up seafood from the dock or from pick-up locations	Consumers pick up seafood from pick-up locations	CSF boxes are often home delivered to consumers
Species Included	Include a diversity of species in CSF box	Include a diversity of species in CSF box	Provide only specific species
Species Exclusions	Species are based on whatever is caught, although some species may be excluded because of consumer preference or sustainability factors	Species are based on whatever is caught, although most offer consumers some customization options	Most provide only high-value types of seafood and mostly products from Alaska
Product Form	Mostly fresh products	Mostly fresh products	Fresh and frozen products
Sourcing	Source from self	Source from a number of fishers and entities	Source from self or a small number of fishers
Local Seafood	Majority define local by where the fish is caught	Majority define local by where the fish is landed	Majority define local socially (i.e. local fishers)

Recognizing the internal differences between communities and the institutions that drive community-based conservation efforts, including CSFs, is an important aspect of effective natural resource management (Agrawal & Gibson, 1999). While CSFs are united by their shortened supply chains, traceability, domestically caught products and effort to inform consumers about their seafood, understanding that the term ‘CSF’ actually represents a variety of arrangements that differ with respect to their philosophies, structures and operations is an important first step to bringing consistency and continuity to how we discuss CSFs. Classifying CSFs as either harvester driven, community driven or species driven based on their attributes can help us more accurately describe how CSFs are structured and correctly discuss the benefits these arrangements are able to provide, while still celebrating the differences among them.

6. REFERENCES

- Agrawal, A., & Gibson, C. C. (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development*, 27(4), 629–649.
- Andreatta, S., & Parlier, A. (2010). The Political Ecology of Small-Scale Commercial Fishermen in Carteret County, North Carolina. *Human Organization*, 69(2), 180–191.
- Bernard, H. R. (2011). *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. Rowman Altamira.
- Borit, M., & Olsen, P. (2012). Evaluation framework for regulatory requirements related to data recording and traceability designed to prevent illegal, unreported and unregulated fishing. *Marine Policy*, 36(1), 96–102.
- Brinson, A., Lee, M.-Y., & Rountree, B. (2011). Direct marketing strategies: The rise of community supported fishery programs. *Marine Policy*, 35(4), 542–548.
- Campbell, L. M., Boucquey, N., Stoll, J., Coppola, H., & Smith, M. D. (2014). From Vegetable Box to Seafood Cooler: Applying the Community-Supported Agriculture Model to Fisheries. *Society & Natural Resources*, 27(1), 88–106.
- Conniff, R. (2014, May 6). Hook, Line, and Sustainable: 5 Ways Community-Supported Fisheries Trump Supermarket Seafood. Retrieved February 26, 2015, from <http://www.takepart.com/article/2014/05/06/how-put-really-legal-seafood-dinner-plate>
- Ellison, K. (2009, December 11). In Birthplace of Local Food, Fish Imports Take Over the Menu. *The New York Times*. Retrieved from <http://www.nytimes.com/2009/12/11/dining/11sffish.html>
- FAO. (2011a). FAOSTAT Food Balance Sheets. Retrieved July 31, 2014, from <http://www.fao.org/fishery/statistics/global-consumption/en>
- FAO. (2011b). *World Review of Fisheries & Aquaculture* (p. 148). Retrieved from <http://www.fao.org/docrep/016/i2727e/i2727e01.pdf>
- Fritsch, P. (2004, October 21). As Shrimp Industry Thrives in Vietnam, Trade Fight Looms. *Wall Street Journal*. Retrieved from <http://www.wsj.com/articles/SB109831535754351344>
- Garcia, S., & Moreno, I. de L. (2003). Global Overview of Marine Fisheries. In M. Sinclair & G. Valdimarsson, *Responsible Fisheries in the Marine Ecosystem*. CABI.

- Grant, M. (2013, October 1). On the Heels of Farm-to-Fork Week, Gordon Bill Supporting Expansion of Community Supported Agriculture Signed by Governor Brown. Retrieved March 23, 2015, from <http://asmdc.org/members/a24/news-room/press-releases/on-the-heels-of-farm-to-fork-week-gordon-bill-supporting-expansion-of-community-supported-agriculture-signed-by-governor-brown>
- Greenberg, P. (2014). *American Catch: The Fight for Our Local Seafood* (1st Edition). New York: Penguin Press.
- Jacquet, J. L., & Pauly, D. (2007). The rise of seafood awareness campaigns in an era of collapsing fisheries. *Marine Policy*, 31(3), 308–313.
- Jacquet, J. L., & Pauly, D. (2008). Trade secrets: Renaming and mislabeling of seafood. *Marine Policy*, 32(3), 309–318.
- King, R., Hand, M., DiGiacomo, G., Clancy, K., Gomez, M., Hardesty, S., ... McLaughlin, E. (2010). *Comparing the Structure, Size, and Performance of Local and Mainstream Food Supply Chains* (No. ERR-99). U.S. Department of Agriculture, Economic Research Service.
- LocalCatch.org. (2012). About the Network. Retrieved March 1, 2015, from <http://www.localcatch.org/about.html>
- Massachusetts Department of Public Health. (1999). 105 CMR 533.000 Fish & Fishery Products. Retrieved from <http://www.mass.gov/eohhs/docs/dph/regs/105cmr533.pdf>
- McClenachan, L., Neal, B. P., Al-Abdulrazzak, D., Witkin, T., Fisher, K., & Kittinger, J. N. (2014). Do community supported fisheries (CSFs) improve sustainability? *Fisheries Research*, 157, 62–69.
- NOAA Fisheries. (2012, June 4). Laying a Solid Foundation for Community Supported Fisheries. Retrieved February 28, 2015, from http://www.fisheries.noaa.gov/stories/2012/06/06_04_12csf_summit.html
- NOAA Fisheries. (2013). The Surprising Sources of your Favorite Seafoods. Retrieved March 23, 2015, from http://www.fishwatch.gov/features/top10seafoods_and_sources_10_10_12.html
- NOAA Fisheries. (2014). *Fisheries of the United States 2013* (Current Fishery Statistics No. 2013) (p. 144). National Marine Fisheries Service, Office of Science & Technology, Fisheries Science Division. Retrieved from <http://www.st.nmfs.noaa.gov/commercial-fisheries/fus/fus13/index>
- Northwest Atlantic Marine Alliance. (2014). Community Supported Fishery. Retrieved March 6, 2015, from <http://namanet.org/our-work/market-transformation/community-supported-fishery>

- Oceana. (2015). Seafood Fraud: Stopping Bait & Switch. Retrieved March 1, 2015, from http://oceana.org/our-campaigns/seafood_fraud
- Olson, J., Clay, P. M., & Pinto da Silva, P. (2014). Putting the seafood in sustainable food systems. *Marine Policy*, 43, 104–111.
- Ostrom, M. (2006). Everyday Meanings of “Local Food”: Views from Home and Field. *Community Development*, 37(1), 65–78.
- Pramod, G., Nakamura, K., Pitcher, T. J., & Delagran, L. (2014). Estimates of illegal and unreported fish in seafood imports to the USA. *Marine Policy*, 48, 102–113.
- Press, M., & Arnould, E. J. (2011). Legitimizing community supported agriculture through American pastoralist ideology. *Journal of Consumer Culture*, 11(2), 168–194.
- Roheim, C. (2008). *Seafood Supply Chain Management: Methods to Prevent Illegally-Caught Product Entry into the Marketplace* (p. 23). IUCN World Conservation Union-US for the project PROFISH Law Enforcement, Corruption and Fisheries Work. Retrieved from http://cmsdata.iucn.org/downloads/supply_chain_management_roheim.pdf
- Vallejo, N., Hauselmann, P., & Asante, R. (2009). *The Role of Supply Chains in Addressing the Global Seafood Crisis* (p. 80). United Nations Environment Programme.
- Worm, B., Barbier, E. B., Beaumont, N., Duffy, J. E., Folke, C., Halpern, B. S., ... Watson, R. (2006). Impacts of Biodiversity Loss on Ocean Ecosystem Services. *Science*, 314(5800), 787–790.

7. ACKNOWLEDGEMENTS

This research would not have been possible without the help of numerous people. First and foremost, thank you to all of the CSF interviewees for generously sharing your time and valuable insights on Community Supported Fisheries. I am inspired by all of your efforts and accomplishments, and hope you will find this research valuable.

Thank you to my advisor, Dr. Xavier Basurto, for all of your continued guidance and mentorship throughout the entire process; I am most grateful to have had the opportunity to work with you on this project. Thank you to Brad Dubik and Josh Stoll for your help formulating the ideas for the research and developing the project. A special thank you to Josh for your help connecting me with all of the CSFs and your assistance reaching out to organizations to set up interviews.

Thank you to the entire Duke University Marine Lab community for fostering a positive learning environment and making Beaufort, NC a fun place to work, study and live. And finally, thank you to my family for all of your continued, unwavering support.

8. APPENDIX

Appendix A: Interview Guide

CSF

Interviewee Name

Date

Time Start

Thank you for agreeing to speak with me regarding your organization. As you know I am Alexis Bolton, a graduate student at Duke University. I am interested in learning more about your CSF structure and model, and why you have chosen to go with your particular setup. I am attempting to interview all CSFs in the United States and Canada for this research.

Are you interested in the results of the study? If so, I would be happy to share them with you when the project is complete in April or May of next year.

I would like to explain a few things about your participation in the research before we begin:

- Your participation in this project is voluntary. It is up to you to decide if you want to be interviewed. If you agree, you can stop the interview at any time for any reason.
- Your participation will involve completing this interview, which will last between 15 and 30 minutes. I will be taking notes during the interview. With your permission, I would also like to make an audio recording for my own reference, so I can re-listen to our conversation and make sure I did not miss anything in my notes, and they will be saved electronically for future reference. If you wish not to be recorded, you can still participate in the study.
- If you do not want to answer a particular question, please let me know. You are not required to answer any questions if you do not want to.

- I will be using your responses to better understand your CSF model, as well as its benefits and challenges. This information will be included in a written report for Duke, and submitted for publication in an academic journal. Due to the nature of my research, your organization may be identified by name; however I will only use the name of your organization with your permission. Please keep in mind that if I use the name of your organization in my research findings, someone reading my report could potentially figure out who you are – rest assured, I will not include the name if I have any reason to believe it will pose any risk to you, or if you explicitly ask me not to include it. If you are not comfortable with identifying your organization by name in my research findings, please let me know.
- If they indicate they do NOT wish to be identified: I will make a note here that you are not comfortable being mentioned by name, which means no mention of your organization by name will be included in any publication, and instead I will identify you by the state to which your organization is located.
- Before agreeing to participate, please feel free to ask me any other questions you have about the interview. You can also ask me any questions at a later time by emailing me. I will also provide you with contact information for my research supervisor at Duke, Xavier Basurto.
- Would you like to be interviewed for my research?
- Do I have your permission to audio-record our interview?
- Do I have your permission to identify your organization in my research findings?

2. First of all, could you tell me in just a few words what *your* role is with the CSF?

--

3. I'd like to know a little bit more about the background of your CSF. How old is your organization and what was it before becoming a CSF?

How old is Organization	
How old is CSF	
Before CSF	

4. What is the goal of your CSF program, and more broadly, your organization?

--

5. Are you affiliated with any institutions, such as universities or non-profit organizations, or have you been in the past?

A. No

B. Yes

--

6. How is your organization legally constituted? For instance, are you a sole proprietor, Limited Liability Corporation (LLC), organized as a cooperative, or do you use some other form of corporate structure?

A. Sole Proprietor

B. LLC

C. Cooperative

D. Other

--

6.1. IF COOPERATIVE: What types of people are members in the coop? For example, does it include fishermen, processors, coordinators, or others?

A. Fishermen

B. Processors

C. Coordinators

D. Others

6.2. In a few words, can you explain why you chose this type of organization?

--

8. Do you sell seafood only through the CSF program, or by other means as well? If so, what are they?

A. No

B. Yes

9. Great. Now I am going to ask you a series of questions about how your CSF operates.

9.1. Do you use a subscription-based service where consumers commit up front to a certain number of shares, or can consumers place orders on a week-by-week basis? Or do you work under a different system? If so, can you briefly describe it?

A. Subscription

B. Week-by-Week Ordering

C. Both

D. Other

9.2. As a follow up to that, in a few words, can you tell me what the benefits are to your organization of using this system?

9.3. Do consumers choose what will be in their share or is it pre-determined?

A. Consumer Picks

B. Predetermined

9.4. Again, just in a few words, can you explain what the benefits are to your organization of using this system?

--

9.5. How long is a CSF season for you and how many do you have per year?

Season Length	
Number per year	

9.6. Do you ship, deliver or use a pick up location to distribute the shares out to consumers?

A. Ship

B. Deliver

C. Pick Up

9.7. How often are shares distributed to consumers? For instance is it weekly or biweekly?

A. Weekly

B. Bi-weekly

C. Other

--

9.8. Who buys your seafood? For instance, do you predominately sell directly to individuals, or to other groups such as restaurants, grocery stores or markets?

- A. Individuals
- B. Restaurants
- C. Grocery stores
- D. Other

9.9. And relatively speaking, which group is the most important to your business?

9.10. Is there anything else that I am missing that I should know about how your CSF operates?

10. Great, now that I have a better understanding of how your CSF works, could you tell me what you think the greatest challenges your organization has experienced with selling seafood through your CSF?

11. I am interested to get a feel for the size of your CSF. I know this is going to vary, and I am not concerned with a specific number, but could you tell me approximately how many members you have per season?

ADDITIONAL PROMPT IF NEEDED: Is it less than 50? Up to 100? Up to 200? More than 200?

We're over half way through; I just have a few more questions for you.

12. In terms of sourcing, how many fishermen contribute to your CSF?

ADDITIONAL PROMPT IF NEEDED: An approximate number is fine, 10, 20, 30 etc.

13. Do you source from another other entities, such as local processors, corporations, or fishermen cooperatives?

A. Local Processors

B. Corporations

C. Cooperatives

D. Other

14. Is the information on your website about the species you provide up to date?

14.1. IF NO: how can I learn about the species you provide in your shares?

A. Email

B. List Over Phone

15. What species of fish do your fishermen catch but are not included in the CSF?

A. None, everything caught is included in the shares

B. Don't know

C. List species not included

15.1. IF ANSWER C:

And as a follow up to that, why are they not included? For instance, is it due to consumer preferences, the value of the species is either too high or too low, or local regulations that prohibit you from including it?

- A. Consumer Preference
- B. Value of species too high
- C. Value of species too low
- D. Regulations
- E. Other

16. Do you consider your product to be sourced locally?

17. And as a follow up to that, what is your definition of the term 'local'?

18. Is there anything else you would like to add about your CSF or the product you provide?

Thank you so much for your time. I know you must be very busy, and I really appreciate you taking the time to speak with me. As I mentioned at the beginning of our call, I would be happy to share the results of the study with you when it is complete in the spring.

Before we finish up, I want to give you the opportunity to make any comments or add anything that you think may be important for us to know, and also ask me any questions you might have about the interview. In any case, you have my contact information, so please feel free to reach out at anytime.

Time End